

WHAT IS CLAIMED IS:

1. A travel control apparatus for a wheel-driven vehicle, comprising:

5 steering operation means for steering a steering wheel of the vehicle;

steering angle detection means for detecting a steering angle of the steering wheel;

10 a steering actuator which changes the steering angle of the steering wheel;

steering control means for performing a control for actuating the steering actuator so that the steering angle of the steering wheel, which is detected by the steering angle detection means, becomes a target steering angle of the steering wheel which 15 is set in response to an operation command outputted from the steering operation means, and

20 traveling speed regulating means for regulating the traveling speed of the vehicle in accordance with an operational state of the steering operation means and an actuation state of the steering actuator.

2. The travel control apparatus for a vehicle according to claim 1, wherein the traveling speed regulating means compares the target steering angle of the steering wheel, which is set in accordance with an operational state of the steering operation means, with the detected steering angle of the steering wheel, which is detected by the steering angle detection means, and, when 25 difference between the target steering angle and the detected

steering angle is a predetermined value or higher, regulates the traveling speed of the vehicle to a predetermined speed or lower.

3. The travel control apparatus for a vehicle according
5 to claim 1, wherein the traveling speed regulating means performs control for comparing the target steering angle of the steering wheel, which is set in accordance with an operational state of the steering operation means, with the detected steering angle of the steering wheel, which is detected by the steering angle detection means, and gradually reducing the traveling speed of the vehicle as
10 the difference between the target steering angle and the detected steering angle increases.

4. The travel control apparatus for a vehicle according
15 to claim 3, wherein the traveling speed regulating means sets a deceleration which increases as the difference increases, and performs a control for gradually reducing the traveling speed of the vehicle on the basis of the set deceleration.

20 5. The travel control apparatus for a vehicle according to claim 1, further comprising:

steering operation speed detection means for obtaining an operation speed of the steering operation means,

25 wherein, when the operation speed of the steering operation means, which is obtained by the steering operation speed detection means, is a predetermined value or higher, the traveling speed regulating means regulates the traveling speed of the vehicle so that the traveling speed of the vehicle becomes a predetermined

speed or lower.

6. The travel control apparatus for a vehicle according to claim 1, further comprising:

5 steering operation speed detection means for obtaining an operation speed of the steering operation means,
wherein, when the operation speed of the steering operation means, which is obtained by the steering operation speed detection means, is a predetermined value or higher, the traveling
10 speed regulating means performs a control for gradually reducing the traveling speed of the vehicle as the operation speed increases.

7. The travel control apparatus for a vehicle according to claim 6, wherein the traveling speed regulating means sets a
15 deceleration which increases as the operation speed increases, and performs a control for gradually reducing the traveling speed of the vehicle on the basis of the set deceleration.

8. The travel control apparatus for a vehicle according to claim 1, further comprising:

20 steering actuator actuation speed detection means for obtaining an actuation speed of the steering actuator,
wherein, when the actuation speed of the steering actuator, which is obtained by the steering actuator actuation speed
25 detection means, is a predetermined value or higher, the traveling speed regulating means regulates the traveling speed of the vehicle so that the traveling speed of the vehicle becomes a predetermined speed or lower.

9. The travel control apparatus for a vehicle according to claim 1, further comprising:

steering actuator actuation speed detection means for obtaining an actuation speed of the steering actuator,

5 wherein, when the actuation speed of the steering actuator, which is obtained by the steering actuator actuation speed detection means, is a predetermined value or higher, the traveling speed regulating means performs a control for gradually reducing the traveling speed of the vehicle as the actuation speed increases.

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10. The travel control apparatus for a vehicle according to claim 9, wherein the traveling speed regulating means sets a deceleration which increases as the actuation speed increases, and performs a control for gradually reducing the traveling speed of the vehicle on the basis of the set deceleration.

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11. The travel control apparatus for a vehicle according to any of claims 1 through 10, wherein the steering control means actuates the steering actuator at a first actuation speed if the size 20 of the steering angle, which is obtained on the basis of detection information from the steering angle detection means, is a predefined reference amount or lower, and actuates the steering actuator at a second actuation speed, which is lower than the first actuation speed, for the same operation command when the size of 25 the steering angle exceeds the reference amount.

12. The travel control apparatus for a vehicle according to claim 11, wherein the steering control means actuates the

steering actuator at the first actuation speed when the target steering angle is set so that the size of the steering angle becomes the reference amount or lower from the state in which the size of the steering angle exceeds the reference amount, even if the size of 5 the steering angle still exceeds the reference amount.

13. The travel control apparatus for a vehicle according to any of claims 1 through 10, wherein the larger the steering angle with respect to a straight forward direction of the steering wheel, 10 the steering angle being detected by the steering angle detection means, the slower the actuation speed of the steering actuator actuated by the steering control means.

14. The travel control apparatus for a vehicle according 15 to any of claims 1 through 13, further comprising:

a steering mechanism having a pair of knuckle arms for swingably supporting the steering wheels around kingpin axes and a tie rod for connecting the pair of knuckle arms,

20 wherein the steering actuator drives the steering mechanism to change the steering angles of the steering wheels,

the steering angle detection means is attached to one of the pair of right and left steering wheels, and

25 the steering control means performs a control for actuating the steering actuator so that one of the steering angles of the pair of right and left steering wheels detected by the steering angle detection means becomes the target steering angle which is set in response to an operation command outputted from the steering operation means.

15. The travel control apparatus for a vehicle according to claim 14, wherein

the steering mechanism is characterized in that a difference is generated between the steering angles of the pair of right and left steering wheels when the vehicle turns, and

the target steering angle is set for one of the pair of right and left steering wheels to which the steering angle detection means is attached, in accordance with an operation direction and the amount of operation of the steering operation means, and

10 the steering control means performs a control for actuating the steering actuator on the basis of the characteristic of the steering mechanism so that the steering angle of one of the pair of right and left steering wheels, which is detected by the steering angle detection means, becomes the target steering angle which is set in accordance with the operation direction and the amount of 15 operation of the steering operation means.